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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,381	07/27/2001	Sadao Haga	71360-56296	7830
21874	7590	07/13/2004	EXAMINER	
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			UMEZ ERONINI, LYNETTE T	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 07/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/916,381		HAGA ET AL.	
	Examiner		Art Unit	
	Lynette T. Umez-Eronini		1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 28 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 8-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/20/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (US 6,284,721 B1) in view of Uchida et al. (US 5,307,296).

Lee teaches, "A cleaning a etching composition for cleaning and etching substrates comprising . . . silicon as a main constituent . . . (Abstract) and "The mixed acid etchant (MAE) consisting HNO_3 :HF:CH₃COOH . . . is conventionally used for etching silicon layers, . . ." However, as such control is still not sufficient, single crystal silicon wafers are treated with H_2SiF_6 in its saturated concentration

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in the above mixed acid etchant solution" (column 4, lines 10-19). The above reads on,

An etching solution containing at least hydrofluoric acid, nitric acid and hexafluorosilicic acid, **in claim 1**;

the etching solution further comprising acetic acid, **in claim 5**; and

the etching solution is used for etching a silicon substrate, **in claim 7**.

Lee differs in failing to specify the concentration of the hexafluorosilicic acid being not less than 10% by weight; hexafluorosilicic acid is 15 to 40% by weight; hydrofluoric acid is 1 to 20 % by weight; nitric acid is 20 to 60% by weight; and acetic acid is 0.01 to 5 % by weight, based on the weight of the etching solution, respectively **in claims 1, 2, 3, 4, and 6**.

Uchida teaches, "... , in wet etching, the temperatures of the etchant and workpiece, the concentration of the etchant, and other conditions influence the rate of etching. . . . Generally, these conditions affect the values of the diffusion coefficients . . . Thus, by specifying or altering the diffusion coefficients, process conditions can be altered so that the topography changes as a function of process conditions can be predicted." (column 7, lines 5-14), which provides evidence that the etchant concentration can be altered, thereby altering the etchant concentration a so-called "result effective variable."

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Lee by using Uchida's method of altering the etchant concentration, which has been shown to influence the rate of etching and to provide evidence that altering the

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etchant concentration is a so-called "result effective variable" since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

4. Applicant's arguments filed April 28, 2004 have been fully considered but they are not persuasive. Applicants traverse the 103 rejection of claims 1-7 over Lee (US 6,284,721 B1) in view of Uchida (US 5,307,296). Applicants argue Lee's MAE (mixed acid mixture) of HF, HNO₃, and CH₃COOH fails to comprise hexafluorosilicic acid. Applicants' argument is unpersuasive because Lee's MAE (column 4, lines 10-12) not only includes HF, HNO₃, and CH₃COOH but also comprises H₂SiF₆ in the mixed acid etchant (column 4, lines 10-19). Lee specifically discloses adding H₂SiF₆ for the purpose of controlling the rate of etching. Since H₂SiF₆ is a known additive to control etch rate, it would be obvious to add any amount to attain a desired etch rate. Applicants have not shown anything unexpected with respect to the claimed concentration of H₂SiF₆.

Applicants further argue the combination of Uchida fails to modify Lee by teaching the use of H₂SiF₆ being less than 10% by weight. Applicants' argument is unpersuasive because Uchida is relied upon to show that the altering the etchant concentration results in the etchant concentration being a so-called "result effective variable."

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Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 517-272-1470. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

ltue

July 6, 2004

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

